

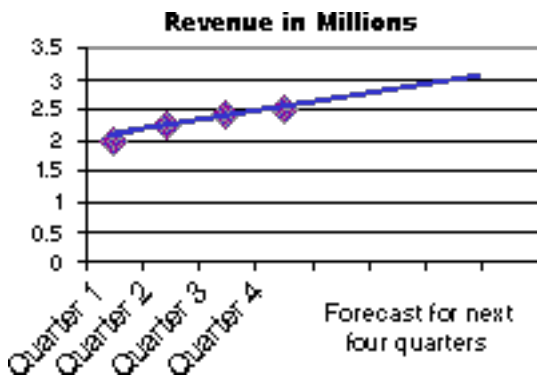
Add a Trend Line to a Chart

A trend line or moving average can be added to any data series in an unstacked, 2-D, area, bar, column, line, stock, xy (scatter), or bubble chart.

NOTE: A trend line cannot be added to data series in a stacked, 3-D, radar, pie, surface, or doughnut chart.

Learn about forecasting and showing trends in charts

Trend lines are used to graphically display trends in data and to analyze problems of prediction. Such analysis is also called regression analysis. By using regression analysis, you can extend a trend line in a chart beyond the actual data to predict future values. For example, the following chart uses a simple linear trend line that is forecasting four quarters ahead to clearly show a trend toward rising revenue.



Tips

- You can also create a moving average, which smoothes out fluctuations in data and shows the pattern or trend more clearly.
- If you change a chart or data series so that it can no longer support the associated trend line — for example, by changing the chart type to a 3-D chart or by changing the view of a PivotChart report or associated PivotTable report — the trend line will no longer appear on the chart.
- For line data without a chart, you can use AutoFill or one of the statistical functions such as GROWTH() or TREND() to create data for best-fit linear or exponential lines.

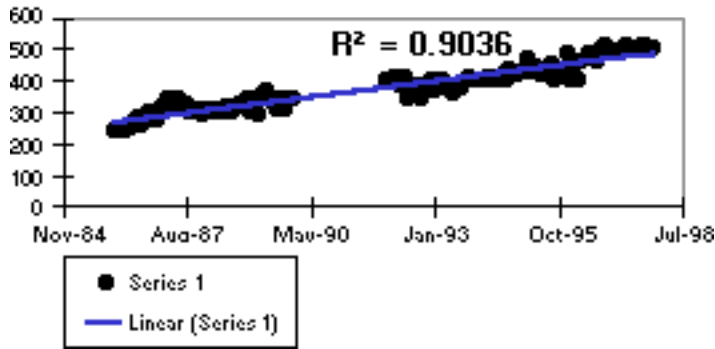
Choosing the right trend line type for your data

When you want to add a trend line to a chart in Microsoft Excel, you can choose any of the six different trend/regression types. The type of data that you have determines the type of trend line that you should use. *A trend line is most reliable when its R-squared value is at or near 1.* When you fit a trend line to your data, Excel automatically calculates its R-squared value. If you want to, you can display this value on your chart.

Linear trend lines

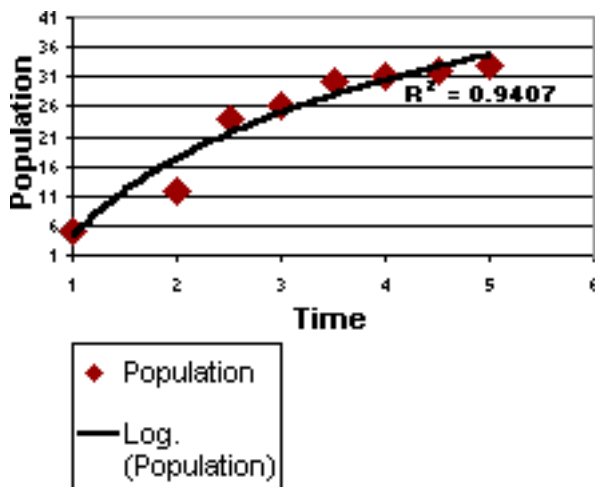
A linear trend line is a best-fit straight line that is used with simple linear data sets. Your data is linear if the pattern in its data points resembles a line. A linear trend line usually shows that something is increasing or decreasing at a steady rate. In the following example, a linear trend line illustrates that refrigerator sales have consistently risen over a 13-year period. Notice that the R-squared value is 0.9036, which is a good fit of the line to the data.

Refrigerator Sales 1985-1998



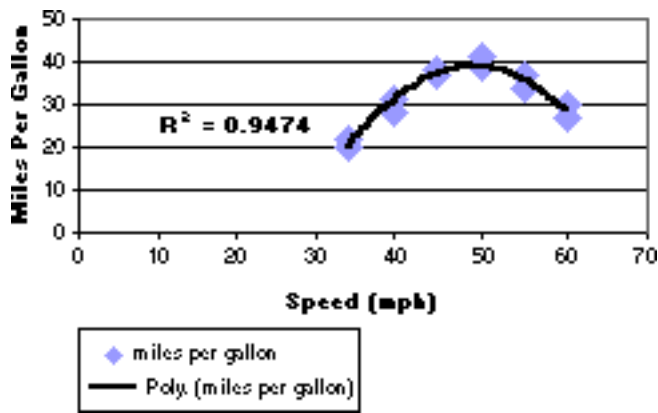
Logarithmic trend lines

A logarithmic trend line is a best-fit curved line that is used when the rate of change in the data increases or decreases quickly and then levels out. A logarithmic trend line can use both negative and positive values. The following example uses a logarithmic trend line to illustrate predicted population growth of animals in a fixed-space area, where population leveled out as space for the animals decreased. Note that the R-squared value is 0.9407, which is a relatively good fit of the line to the data.



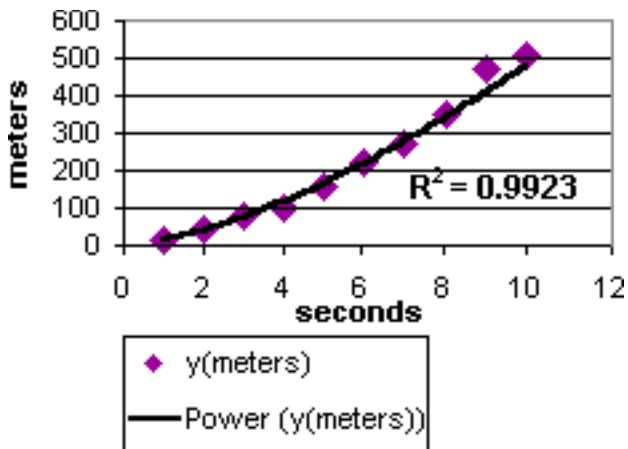
Polynomial trend lines

A polynomial trend line is a curved line that is used when data fluctuates. It is useful, for example, for analyzing gains and losses over a large data set. The order of the polynomial can be determined by the number of fluctuations in the data or by how many bends (hills and valleys) appear in the curve. An Order 2 polynomial trend line generally has only one hill or valley. Order 3 generally has one or two hills or valleys. Order 4 generally has up to three. The following example shows an Order 2 polynomial trend line (one hill) to illustrate the relationship between speed and gasoline consumption. Notice that the R-squared value is 0.9474, which is a good fit of the line to the data.



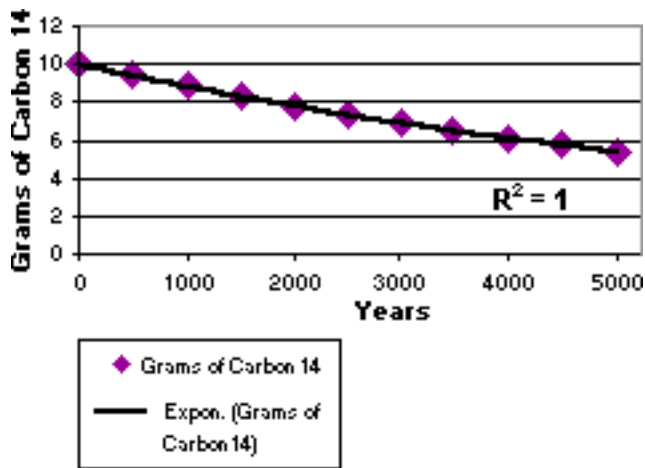
Power trend lines

A power trend line is a curved line that is used with data sets that compare measurements that increase at a specific rate — for example, the acceleration of a race car at 1-second intervals. You cannot create a power trend line if your data contains zero or negative values. In the following example, acceleration data is shown by plotting distance in meters by seconds. The power trend line clearly demonstrates the increasing acceleration. Note that the R-squared value is 0.9923, which is a nearly perfect fit of the line to the data.



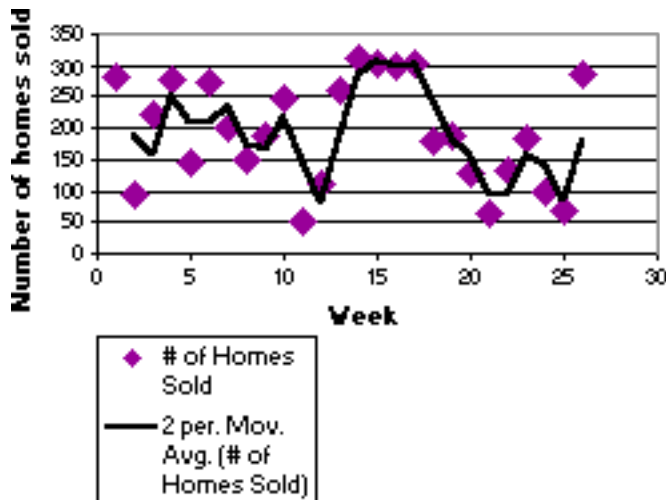
Exponential trend lines

An exponential trend line is a curved line that is used when data values rise or fall at increasingly higher rates. You cannot create an exponential trend line if your data contains zero or negative values. In the following example, an exponential trend line is used to illustrate the decreasing amount of carbon 14 in an object as it ages. Note that the R-squared value is 1, which means that the line fits the data perfectly.



Moving average trend lines

A moving average trend line smoothes out fluctuations in data to show a pattern or trend more clearly. A moving average uses a specific number of data points (set by the Period option), averages them, and uses the average value as a point in the line. If Period is set to 2, for example, then the average of the first two data points is used as the first point in the moving average trend line. The average of the second and third data points is used as the second point in the trend line, and so on. In the following example, a moving average trend line shows a pattern in number of homes sold over a 26-week period.



Add a trend line

1. On a chart sheet or in an embedded chart, click the **data series** to which you want to add a trend line or moving average.
2. On the Chart menu, click Add Trend line.
3. On the Type tab, click the type of regression trend line or moving average that you want.
4. If you select Polynomial, type the highest power for the independent variable in the Order box.
5. If you select Moving Average, type the number of periods to be used to calculate the moving average in the Period box.

NOTES

- The Based on series box lists all of the data series in the chart that support trend lines. To add a trend line to another series, click the name in the box, and then select the options that you want.
- If you add a moving average to an xy (scatter) chart, the moving average is based on the order of the x

values plotted in the chart. To get the result that you want, you might need to sort the x values before adding a moving average.

Change trend line settings

1. On a chart sheet or in an embedded chart, click the trend line that you want to change.
2. On the Format menu, click Selected Trend line.
3. On the Options tab, select the options that you want.
4. To change the name of the trend line or moving average, type a name in the Custom box.

Display the R-squared value for a trend line

1. On a chart sheet or in an embedded chart, click the trend line for which you want to display the R-squared value.
2. On the Format menu, click Selected Trend line.
3. On the Options tab, select Display R-squared value on chart.

NOTE: You cannot display an R-squared value for a moving average.

Remove a trend line

- On a chart sheet or in an embedded chart, click the trend line that you want to remove, and then press DELETE.

Or you can right-click the trend line, and then click Clear.

TIP You can also remove a trend line immediately after you add it to the chart by clicking Undo on the Edit menu, or by pressing CTRL+Z.